
```
% code for problem 3
```

```
n = 10;
```

```
A = zeros(n);
```

```
for i = 1:n
```

```
    for j = 1:n
```

```
        if i == j
```

```
            A(i, j) = 2;
```

```
        end
```

```
        if i == j + 1 || i == j - 1
```

```
            A(i, j) = -1;
```

```
        end
```

```
    end
```

```
end
```

```
% get L, U, and P
```

```
[L, U, P] = lu(A)
```

```
L =
```

Columns 1 through 7

1.0000	0	0	0	0	0	0
-0.5000	1.0000	0	0	0	0	0
0	-0.6667	1.0000	0	0	0	0
0	0	-0.7500	1.0000	0	0	0
0	0	0	-0.8000	1.0000	0	0
0	0	0	0	-0.8333	1.0000	0
0	0	0	0	0	-0.8571	1.0000
0	0	0	0	0	0	-0.8750
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Columns 8 through 10

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
1.0000	0	0
-0.8889	1.0000	0
0	-0.9000	1.0000

```
U =
```

Columns 1 through 7

2.0000	-1.0000	0	0	0	0	0
0	1.5000	-1.0000	0	0	0	0
0	0	1.3333	-1.0000	0	0	0
0	0	0	1.2500	-1.0000	0	0
0	0	0	0	1.2000	-1.0000	0
0	0	0	0	0	1.1667	-1.0000
0	0	0	0	0	0	1.1429
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Columns 8 through 10

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
-1.0000	0	0
1.1250	-1.0000	0
0	1.1111	-1.0000
0	0	1.1000

$P =$

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	1

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